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The Examination of the Stud Bull for Soundness

DISCUSSION BY THE CENTRAL VETERINARY SOCIETY*

Mr. N. J. SCORGIE (Royal Veterinary College): The primary consideration round which the veterinary examination of bulls must revolve is *reproductive efficiency*, *i.e.*, the capacity for the successful fertilisation of the largest number of ova with the fewest possible services. The use of the term "soundness" in regard to bulls, therefore, holds altogether different implications from the meaning of the term as used in connection with the veterinary examination of horses. Yet, if a general statement were required as to the nature of unsoundness in the bull, I can think of none better than an adaptation of Mr. Baron Park's definition of what constitutes unsoundness in the horse (see "Coates *v.* Stephens" in Moody and Robinson's Law Reports. 2. 158):—

> If at the time of examination the bull has any disease, which either actually does diminish the natural usefulness of the animal, so as to reduce his reproductive efficiency; or which, in its ordinary progress may diminish the usefulness of the animal; or if the bull has, either from disease or accident, undergone any alteration of structure or function that either actually does at the time, or in its ordinary effects will, diminish the natural usefulness of the bull, such a bull is unsound.

Arising from the above definition, the various forms of unsoundness may be classified under the following headings:—

(I) Interference with sexual desire.
(II) Inability to copulate.
(III) Complete inability or reduced capacity to fertilise.
(IV) The presence of any infectious or contagious disease, which is likely to diminish the natural usefulness of the bull.
(V) The presence of any defect or abnormality which is held to be hereditary and which is calculated to diminish the natural usefulness of the bull's progeny.

Method of Examination

Before proceeding to a consideration of some of the more common conditions that may affect reproductive efficiency, it may be worth while to direct attention to the routine which should be adopted in the veterinary examination of bulls. As a result of a fairly considerable experience in such examinations, I have adopted the following method: The examination falls into two distinct parts:—

I. The General Examination.
II. The Evaluation of Semen and Fertility Tests.

I. THE GENERAL EXAMINATION

The general purpose of the procedures included under this heading is to determine whether the bull is affected with:—

(*a*) Any contagious or infectious disease.
(*b*) Any defect or condition which interferes, or is likely to interfere, with the bull's breeding capacity.
(*c*) Any anatomical defect or abnormality known, or likely, to be hereditary.

The routine which I have evolved for carrying out this part of the examination is as follows:—

(i) Check ear marks and other means of identification.
(ii) Note the general condition of the bull, with special reference to breeding capabilities, *e.g.*, good or poor breeding condition, over-fat.
(iii) Inspection of the bull whilst walking with a view to detecting lameness or other abnormality of gait.
(iv) Examination for the presence of any anatomical defects or abnormality, particularly of the back, hind legs or feet, which might interfere with the bull's ability for service.
(v) Examination for evidence of the presence of any infectious or contagious disease and for external parasitic infections. (*Note.*—Where freedom from tuberculosis or contagious abortion is a prerequisite in the purchase of a bull, or for any other purpose, the diagnostic tests for these diseases should have been carried out before submitting the bull to further examination.)

(vi) *Examination of the External Genitalia.*—The testes are examined for changes in size and consistence and for evidence of heat and pain. The epididymes and part of the vasa deferentia are palpated, particular attention being paid to the lower portion (tail) of the epididymes, which is often a predilection focus for infective bacteria. If evidence of infection is found either in the testes or epididymes, confirmatory evidence of this may be obtained from an examination *per rectum* of the vasa deferentia, vesiculae seminales and prostate glands. It is not, however, part of my usual routine to carry out rectal examination if the external genitalia are clinically normal.

The preputial orifice and hair is examined for the presence of any abnormal discharge or of granular deposits. The penis is best examined when semen collections are being made, when observation is directed to any visible abnormalities such as nodules, vesicles, pustules, abnormal swelling or congestion, tumours, etc.

Examination of the Bull for Trichomoniasis.—This may be considered an essential part of the examination of bulls which have previously been used for natural service. It is unnecessary in the case of a young bull which has not been so used.

The bull's breeding history and the breeding records of the cows in the herd, if available at the time of examination, give a valuable indication as to the possibility of infection existing in the bull.

I have some doubt as to whether the methods usually practised for obtaining material from the preputial cavity for examination for *T. foetus* can be regarded as satisfactory diagnostic procedures. In a number of herds in which a diagnosis of trichomoniasis has been established by examination of vaginal material obtained from cows, I have consistently failed to find *T. foetus* in the preputial material obtained from the bulls serving these same cows. This is in agreement with Kust (1935) who was unable to demonstrate trichomonads in any of the genital organs of bulls with chronic infections and which were transmitting trichomoniasis to cows. Abelein (1941) has, however, been able to demonstrate trichomonads in the preputial cavity in 150 out of a total of 153 infected bulls. It is possible, therefore, that there may have been some flaw in my technique, although a partial explanation may be sought in the findings of Hammond and Bartlett (1943) who report that *T. foetus* was usually found in highest numbers in the portion of the glans penis not including the galea glandis, with relatively lower numbers scattered over the remainder of the penis and prepuce. Variations in the number and in distribution of trichomonads were also noted both in different individuals and in the same individual at different times. These workers conclude that their findings with respect to distribution of *T. foetus* in the preputial cavity indicate that the accuracy of diagnosis will be improved by making certain that in obtaining samples, material is obtained from the surface of the glans penis and adjacent prepuce.

(vii) *Service Behaviour of the Bull.*—In the examination of bulls for artificial insemination purposes, observation of service behaviour is considered an essential feature in arriving at a decision as to the bull's suitability or otherwise. It is no less essential for natural breeding purposes, particularly when the subject is over the age at which young untried bulls are normally offered for sale (12 to 18 months). It is certainly a practice which can usefully be followed when the subject is a mature or aged bull.

The two main considerations under this heading are:

(*a*) Tractability of the bull.
(*b*) His reaction time at service.

Tractability is clearly of greater importance in older bulls than in bulls at the yearling stage. For bulls which are required to be used for controlled service, whether natural or artificial, it is obviously an advantage when the bull can be easily handled and led. Unless there are some special circumstances, evidence of bad temper or viciousness should be held as warranting rejection of the animal in question. If the examining veterinarian is unwilling to assume the onus of rejecting a bull on these grounds, he should mention the fact in any certificate which he may give.

By *reaction time* is meant the interval which elapses between the bringing of the bull up to the cow and the performing of coition. A second trial should be made shortly after the first. From the reaction times at the two trials it is possible to obtain

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an estimate of the bull's keenness for service. For artificial insemination purposes, keenness is of extreme importance and great attention should be paid to a bull's reaction time; it should be possible to obtain four collections of semen within 30 to 45 minutes without any undue lengthening of the successive reaction times. "Slow" breeding bulls involve the stockbreeder and his servants in a considerable loss of time, *e.g.*, often as much as half to one hour has to be spent with such bulls before they will make any real attempt at service. Under the conditions which exist at artificial insemination centres such a waste of time would be inadmissible. (Some aspects concerning the problem of "slow" breeding bulls are discussed under the heading "Interference with Sexual Desire" below.)

II. The Evaluation of Semen and Fertility Tests

I have left a consideration of this part of the examination to be dealt with by Mr. Stewart.

A Consideration of Some of the Unsoundnesses of Bulls

The following consideration of some of the unsoundnesses of bulls is largely based on personal experience. Reference is made to the literature only when it contributes any useful information to the aetiology and understanding of the conditions under discussion.

Interference with Sexual Desire

Sexual desire may either be completely absent or so reduced as to diminish the natural usefulness of the bull. The age of the bull must receive careful consideration before classing reduced sexual desire as an unsoundness.

Complete absence of sexual desire is frequently met with in young bulls of all breeds at their first few trials at service. Here, the condition is usually only temporary and by proper management the bull can be quickly educated to attempt service, even though he may not be able for some time to perform complete coition. The procedure which I have found most effective in educating such bulls is to have the cow held by a halter; the bull is then brought up to the cow's backquarters. If the bull makes no attempt at mounting—very frequently he will attempt to suckle the cow—the cow is then led forward a short distance with the bull following. If he still makes no attempt to mount, the process is repeated and so on until the bull realises what is required of him. I make no claim to originality for this method of "teasing," but few people seem to be aware of it, and I have no hesitation in stating that it is more quickly successful than the usual method of leading the bull away from the cow. I have only met one young bull which would make no attempt at service after prolonged teasing. This was a yearling Aberdeen Angus, a Royal Show winner which was grossly over-fat. The treatment in this case was fairly simple—*viz.*, to run the bull at pasture for three or four months; by the end of that time he had lost much of his high condition and was quite willing to serve. *The general conclusion with regard to lack of sexual desire in young bulls, then, is that it is usually only a temporary condition arising from lack of experience and, as such, cannot be regarded as an unsoundness.*

The position is quite otherwise with older bulls, which either refuse or are slow at service. In a few such cases, it may be possible to find a cause for the condition, *e.g.*, sexual over-use, wrong feeding, change of environment, but in the majority of cases no real reason can be found. The prognosis in the case of aged bulls (over five years old) is not hopeful; the usual course in such animals is for the condition to become progressively worse. Younger bulls (two to four or five years old), however, frequently return to normal with the removal of the cause, and frequently without any observable reason. In both these latter types of case, therapy with hormones or ascorbic acid has not proved sufficiently successful for its general recommendation. A detailed consideration of the possible aetiology of interference with sexual desire does not come within the scope of this paper. Slowness at service or "lazy service" may, however, sometimes be associated with the initial, and usually acute, phase of trichomonas infection (Kust, 1933; Abelein, 1941; Kerr, 1942, and others). Before such a diagnosis is made, it is essential to establish *T. foetus* infection preferably in the bull himself or, if this is not possible, at least in the cows with which he has been mated.

Loss of sexual desire in older bulls may frequently follow on a change of ownership and management. In this connection, it is important to realise that older bulls often become creatures of habit and will refuse to take any sexual interest in a cow when the method of service is changed as, for example, from hand service to turning the cow into the bull's box or *vice versa*. The learned judge in one recent case of this kind said that the bull was a temperamental animal and not an automaton. We must, therefore, not ignore the fact that in some instances psychic influences may play an important part in loss of sexual desire in bulls.

Inability to Copulate

Here sexual desire is normal but the bull is unable to perform the act of coition. The causes are numerous but *inter alia* they include immaturity in young bulls; morbid changes in the skeleton, joints, muscles, and feet; inflammatory changes in the penis and prepuce which cause the bull pain during protrusion of the prepuce; "pot belly," which may act as a mechanical obstruction.

During the last few years I have repeatedly been consulted about young bulls, usually between ten and 15 or 16 months, which are said to be unable to protrude the penis beyond two or three inches and are consequently unable to copulate. The great majority of the bulls which I have seen have been pedigree Dairy Shorthorn bulls, sold at the various Shorthorn Society's sales, although I do not infer that the condition is met with only in Shorthorns. Sexual desire in such cases is normal, and there are no detectable abnormalities in the penis or in conformation. The only possible course is to adopt a policy of waiting, for there is little doubt that the condition is due to immaturity or underdevelopment of the genitalia. If such a bull is tried at service at frequent intervals, or turned out with a lot of heifers, the sexual stimulation so obtained will in time result in the normal development of the penis. One untoward result from repeated trials with a young bull of this type, which I have met, was the appearance of a painful inflammatory swelling in the mid-line of the back immediately anterior to the sacrum, which had apparently been caused by the bull's vigorous, but unsuccessful, attempts at service. A somewhat similar lesion occurring in heavy beef bulls has been reported from Argentina (Newton, 1941), where it is stated that there is laceration of the psoas fibres and of the inferior common vertebral ligaments at their points of insertion on the vertebral bodies.

Of some 25 young bulls presented with a history of being unable to copulate, I have only met with one where it was possible to give a definite diagnosis of permanent inability to protrude the penis. The history of this bull was that as a calf he had been rather poorly fed owing to shortage of food. When I first saw the bull he was 18 months old and slightly under-sized. He made vigorous attempts at service but was unable to protrude the penis when mounted in the copulating position on the cow; as he mounted or dismounted, however, the tip of penis was protruded from the sheath. At first, it was thought that a loose baggy fold of skin in the region of the umbilicus was interfering with protrusion of the penis when it was fully erected. This proved, however, not to be the case for after elimination of this fold of skin by operative means the same syndrome was observed. In the absence of any other abnormality, an impression was now formed that the penis was smaller and shorter than normal, it was decided to try myotomy of the retractor penis muscles as described by Forssell (1935) and by Götze (1934). The operation was carried out but without any improvement occurring. At subsequent *post-mortem* examination, no abnormalities were detectable in the penis or other parts of the genital apparatus.

An example of mechanical interference with coition resulting from a gross "pot belly" has recently been met with in a mature Jersey bull. The size of the belly in this case caused the penis to be directed too low to effect entry into the vagina of the female at service. An interesting sidelight on this case was that the bull had been fed on excessive quantities of silage (30 to 40 lb. per day), which American breeders have found by experience to be conducive to slowness and often to low fertility. (For this information I am indebted to Professor H. A. Hermann of the University of Missouri.)

Complete Inability and Reduced Capacity to Fertilise

In the great majority of cases of complete inability or reduced fertilising capacity, there is no reduction of sexual desire in the bull, a fact which makes the early diagnosis of these conditions difficult.

Reduced capacity for fertilisation is undoubtedly the most common form of unsoundness encountered in the bull. This, too, is the form in which the condition can cause the greatest loss, because with such bulls the production of an occasional calf may result in the lapse of some considerable time before the stockowner realises that a considerable number of cows are turning to service. The completely sterile bull can usually be suspected earlier.

Diagnosis of interference with fertilising capacity is based on the bull's breeding history and on the examination of semen samples obtained by means of the artificial vagina. Care must, of course, be taken to exclude the cows as being the source of low fertility in any herd.

I do not propose here to deal with examination of semen, but I would like to cite three unusual cases (one British Friesian and

two Jersey bulls) where the sperm was normal by every test that can be applied, and yet all three bulls were completely sterile and never at any time sired a calf. Lagerlof (1936) has apparently observed similar cases.

According to Lagerlof (1938), who has carried out careful and detailed investigations on the causes of infertility in bulls in Sweden, the commonest morbid changes in the testicles which give rise to reduced or ceased capacity to fertilise are:—

(i) Testicular hypoplasia, about 23 per cent. of cases.
(ii) Degenerative changes in the seminal epithelium, about 41 per cent. of cases.
(iii) Fibrosis testis, about 12 per cent. of cases.
(iv) Inflammatory testicular changes, about 24 per cent. of cases.

(*Note*: The similar hereditary type of testicular hypoplasia met with in the Swedish Highland breed of cattle is not included in the above figures.)

No similar statistics of the causes of infertility in bulls are available for this country.

Hypoplasia testis.—I have met two definite cases of this condition in young pedigree Shorthorn bulls. In each case the hypoplasia was bilateral, the testes being about half the normal size. Both the animals in question showed normal sexual desire. In one of the cases, where it was possible to retain the animal for service trials, he proved to be completely sterile. The sperm picture of this bull showed only a few abnormal spermatozoa and a large amount of cellular debris. In addition to Lagerlof (1936), Williams (1936) and Fincher *et al.* (1942) describe similar cases. The latter authors found that of six totally sterile bulls investigated, hypoplasia of the testes was present in three of the cases. (Diagnosis based on histological examination of the testes.)

I have also met a number of other cases where hypoplasia was suspected but unproved. Unless the size of the testes is greatly reduced, diagnosis of the condition is not easy, and it was not possible in the cases referred to to obtain the testes for histological examination.

Degenerative Testicular Atrophy.—All observers are agreed that degenerative processes in the testicle characterised by atrophy of the epithelium of the seminiferous tubules constitutes the most common cause of infertility in the bull. The causes are manifold and include disturbances in nutrition, seasonal effects, fevers and intoxications, and hormonal disturbances; in any given case it is almost always impossible to determine the operative cause with any certainty, and doubtless there are many at present unknown causes in addition to those cited as possibilities.

In connection with testicular degeneration the truth of Lagerlof's (1938) statement is undeniable: "*Hardly any other organ seems capable of reacting so rapidly as a result of all possible external and internal influences as the testicles.*" Gunn *et al.* (1942) in their fertility studies in rams make a similar observation: "*The most remarkable feature of this investigation has been the demonstration of the very great susceptibility of rams to seminal changes due to what might have been regarded as relatively insignificant causes.*"

In the time at my disposal I cannot deal with the sperm picture or the histological changes in the varying degrees of testicular degeneration. Where the degeneration is relatively slight the testicular changes may be fairly quickly reversible without any obvious reason or treatment. It is of some importance to remember this fact in connection with disputes over allegedly infertile bulls.

Inflammatory Testicular Changes.—These produce characteristic changes in the testes which are easily discoverable at a clinical examination. The commonest cause of orchitis in bulls is undoubtedly *Br. abortus*. Usually only one testicle is affected but Lagerlof (1938) states that the other undergoes degenerative changes and loses its capacity to form spermatozoa. Richter (1938) also points out that bulls which have had acute *Brucella* orchitis in the testicle must be looked upon as useless for further breeding purposes. The degenerative changes in the non-infected testicle are apparently due to failure of the scrotum to perform its heat regulating function owing to the inflammatory changes occurring within it. Lagerlof (loc. cit.) states, however, that if the diseased testicle is removed immediately at the onset of the orchitis, it is generally possible to save the sound testicle and preserve the bull's capacity for breeding. As a testicle which has been subjected to acute inflammation practically never regains its ability to produce fertile spermatozoa, there is no valid reason for delaying unilateral castration if such a case should be met with.

A case of orchitis in a bull, vaccinated a year previously, in which *Br. abortus*, Strain 19, was isolated from the testicle has been recorded by Danks (1943).

C. pyogenes has been recorded as a cause of orchitis in rams (Hart, 1919) but not, so far as I am aware, in other species. I have a record of an aged bull, where *C. pyogenes* could be regularly isolated from the sheath and from the semen, and it is of some interest to record that the cows served by this bull did not show any clinical evidence of *C. pyogenes* infection, although the organism could be intermittently isolated from the cervices of some of them.

I have recently met with an orchitis in a mature bull used at an artificial breeding centre. This bull had passed the agglutination test on numerous occasions, and the only organism of any significance which could be isolated from the semen was *Pseudomonas pyocyanea*. The data available in this case does not permit the assumption that this organism was the cause of the orchitis, although Gilman (1921) considers it of aetiological importance in genital infections. Gunsalus *et al.* (1941) also report the finding of *Pseudomonas pyocyanea* in the semen of five out of 19 bulls examined; all five bulls in question were later discarded from an artificial breeding organisation because of low fertility or complete sterility.

Fibrosis testis.—This is the end result of both degenerative and inflammatory changes of the testicles. Affected animals have usually a history of long sterility. Clinically the condition is distinguishable by the fact that the testes feel harder than normal.

Hereditary Defects

A large number of hereditary lethal defects have been recorded in cattle (see review papers by Eaton, 1937; Hutt, 1934; and Lerner, 1944) but none of these has been detectable in either of the parents of the affected progeny. Of non-lethal hereditary defects applicable to the bull, four possible examples are cited.

Hypoplasia testis.—There is some doubt as to whether this condition is ordinarily hereditary. Since, however, the condition is bilateral and the males so affected are sterile, the animals are automatically discarded from breeding and it is, therefore, only the unilateral condition which has any practical significance. Eriksson (1943) and Lagerlof (1938) have recorded an interesting type of unilateral hypoplasia, which the former author has shown to be hereditary, occurring in the Swedish Highland breed of cattle. In the females the condition is manifested by ovarian hypoplasia, which may be uni- or bi-lateral.

Cryptorchidism.—Since the operation of the Licensing of Bulls Acts, veterinarians do not ordinarily meet with cryptorchidism in the bull. The general incidence of the condition is probably about three per thousand of the bulls presented, at approximately nine months of age, to the Ministry of Agriculture's Livestock Inspectors. (For this information I am indebted to the late Capt. J. M. Thornycroft, Superintending Inspector, Livestock Branch, Ministry of Agriculture.) It may be actually somewhat higher than this in the total number of bulls born, for it would be reasonable to suppose that a stockowner who suspected the condition in a young bull would not present the animal for inspection for licence.

Cataract.—I have recently met a case of bilateral cataract in a young Shorthorn bull presented for approval for artificial insemination purposes. I have no reason for believing that the condition in this particular case was hereditary. Gregory *et al.* (1943), however, have recorded hereditary cataract in Jersey cattle in the U.S.A. One interesting feature of this report is that the heifers affected with cataract were all highly nervous animals because of inability to see properly and, on this account, failed to let down their milk properly at milking time, and so proved to be indifferent milkers. Other examples of hereditary cataract in cattle have been recorded in Friesians by Small (1919) and Detlefson and Yapp (1920).

Viciousness.—An Ayrshire bull at the age of three or four years became so intractable that special arrangements had to be made for service and feeding, etc.; in the end he became so vicious that he had to be destroyed. The interesting point in regard to this case, however, was that the great majority of the heifers sired by the bull proved to be highly nervous animals, which did not let their milk down properly at milking time, and which in consequence yielded far below normal expectations. This same bull also sired a son which was retained in the herd and which, like his sire, was ultimately destroyed because of his vicious temperament. This is the only case within my knowledge where bad temper and nervous temperament have been hereditary, but experienced stockbreeders have assured me that it is not an isolated one.

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The Evaluation of Semen and Fertility Tests

Mr. D. L. STEWART (Reading A.I. Centre): Mr. Scorgie has dealt fully with the General Examination of the stud bull, and I will therefore confine my remarks to the above sub-heading.

The final criterion of a bull's soundness is his fertility and this can only be assessed by his success when mated to normal cows. However there are many occasions when the veterinary surgeon is required to predict the probable breeding efficiency of a bull, or decide whether the bull can be incriminated in an outbreak of sterility. In order to test the fertility of a bull, resort has to be made to the examination and evaluation of semen. This provides no easy problem, and in my brief remarks I hope to suggest practical ways of estimating a bull's efficiency when used for natural mating. The standard in natural mating is not necessarily the standard that one would use in selecting a bull to be used for artificial insemination, and since for this latter purpose the examinations are carried out by the Ministry of Agriculture's Sterility Advisory Officers, my remarks will refer only to natural mating.

The views expressed are a blending of my own personal experiences and current literature, in particular Lagerlof (1936), Herman and Swanson (1941), and Laing (1944). It must be realised that any practical basis for forecasting fertility from semen examination is open to criticism and the following difficulties present themselves:—

1. *Standard of Fertility.*—A service rate of up to 2·0 services per conception, *i.e.*, 50 per cent. of matings fertile, can be considered normal and satisfactory. From 2·0 to 3·5 services per conception might be permissible in the case of a valuable bull, although with such results, where there was suspicion of infertility in the cows, confusion would arise as to the origin of the poor fertility. Any results over 3·5 are quite unsatisfactory.

2. *Sub-fertile Bulls.*—All grades of fertility exist, varying from the highly fertile to the completely sterile, but the practical difficulty lies in dividing the fertile from the sub-fertile.

3. *Variations in Individual Bulls.*—All bulls vary from time to time, the cause of the variation being generally unknown. It must be admitted from my Artificial Insemination Centre experience that the bulls of high fertility rarely produce a poor semen sample.

4. *Apparently Normal Semen.*—A few bulls have been reported as providing normal semen, yet proved ineffective when mated to apparently normal cows. Such cases require further investigation, but I have no personal experience of the phenomenon.

Examination of Semen

The most satisfactory samples of semen are those obtained by the artificial vagina, and the following observations refer only to samples collected in this way:—

(*a*) Volume.—Considerable variation is found in the volume of each ejaculate, and this may be the result of many factors, for example errors in collecting, amount of work prior to examination, amount of semen retained in the lining of the artificial vagina, etc. The volume ejaculated by bulls of normal fertility varies from 1·5 to 20 c.c., but generally one would expect about 4·0 c.c. from a mature bull (over two years old). This is about the average volume obtained from bulls on Artificial Insemination Centres.

(*b*) Density.—Normal semen has a rich milky white appearance, but samples vary in density to water clear, with no spermatozoa present. The density can be accurately estimated by the use of a haemocytometer as in a blood-cell estimation except that a dilution of 1 in 200 physiological saline is more suitable. The concentration of spermatozoa varies from zero to 2,000 million per c.c. and samples containing 500 million are about the minimum compatible with good fertility.

(*c*) Total Numbers of Spermatozoa.—This figure may be obtained by multiplying the volume by the density, and bears a similar relationship to fertility as density.

(*d*) Motility.—This is the most reliable field test of quality, but is purely subjective and thus depends on the individual observer. Most workers achieve consistency by adopting a standard, and I rate semen samples thus—when viewed under the low power objective of the microscope:—

5. Good wave motion. Individual spermatozoa cannot be identified, and the sample shows masses of cells moving in vigorous dark currents whirling throughout the field.

4. Poor wave motion. Some wave motion present, but many individual spermatozoa may be identified.

3. Good motility. Majority of spermatozoa actively motile, but no wave motion.

2. Poor motility. Less than 50 per cent. of spermatozoa actively motile.

1. Slight oscillating movement, but no cells showing progressive movement.

0. All motility absent.

On the above system of marking, semen samples graded 5 and 4 are satisfactory, although those graded 3 may produce good results.

During examination, it is important that the semen be kept as near 37° C. as possible and that the film examined should be thick.

(*e*) Abnormal Spermatozoa.—The correlation between the percentage of abnormal spermatozoa and fertility has caused much discussion, which suggests that there is no definite evidence to guide one on this subject. Formerly great stress was laid on this by both the veterinary and medical professions, but gradually it has been dropped by the former. It is reasonable to expect that a bull with testicular degeneration will produce a high percentage of abnormal spermatozoa, and yet it is known that fertile bulls may produce 50 per cent. abnormal spermatozoa. The issue is complicated by the difficulty in recognising abnormal forms in stained and unstained preparations. Most workers have different criteria and this would explain the great variation in the conclusions reached. I must admit that I completely ignore the examination for abnormal sperm in routine work.

(*f*) Storage.—It has been shown that semen of high fertility and excellent initial motility retains its motility for a longer period when stored than does semen of poor quality.

Fresh semen from bulls of high fertility stored at 40° F. should retain good motility for over 30 hours and semen from bulls of poor quality for less than 24 hours. Similarly, when diluted with egg yolk buffer solution, samples of very high fertility maintain motility for over 200 hours, good fertility 100 to 200 hours, while those of poor fertility less than 100 hours. The dilution used is usually 1 to 3.

Correlations have been shown to exist between fertility and *p*H changes of semen and between fertility and respiration rate of semen, but these methods cannot be used in general practice at present.

Pus, blood cells and trichomonads may be found occasionally. Ejaculates of pus usually indicate pyogenic infection of the seminal vesicles and such bulls are sterile. Blood is the result of injury to the penis during collection, and trichomonads have been recognised in the semen of infected bulls. As the finding of the parasites depends on chance it has no diagnostic significance.

Miscellaneous

The following are a few practical hints which may be of interest to those new to this work.

1. On strange farms, where the staff is not accustomed to this work, it is always preferable to use a cow in oestrus as the teaser. Often one fails to obtain semen when using a quiet cow not in oestrus.

2. Avoid chilling of semen in cold weather. This is detrimental to the quality and may be avoided by using a thermos collecting cup, or "muffing" the collecting tube.

3. Avoid too high a temperature in the artificial vagina. Apart from injury to the bull, the semen may be damaged. The most suitable temperature is about 42° to 45° C.

4. The temperature at which the semen is examined is important and in cold weather it is best to carry out examinations in the farm kitchen or a warm dairy. Out of doors, motility ceases rapidly with cold and therefore gives a false impression of the true motility of the sample.

5. If on examination of an apparently good sample, the sperm are all dead, suspect the technique rather than the bull. This may be the result of contamination with water or antiseptics, or as a result of over-warming the slide. Re-examine sample and if necessary re-test the bull.

6. Always make sure that the bull has thrust and given a proper ejaculation, otherwise the sample will consist of seminal fluid with few or no sperm present. In other instances semen of poor quality is obtained which is not typical of the bull. The latter may be peculiar to bulls on Artificial Insemination Centres.

7. To avoid contamination of semen with debris, see that all preparations for collection are carefully made. Repeated attempts to collect produce dirty samples and it is advisable to swab out

vagina with spirit when taking subsequent samples in the same artificial vagina from the same bull.

Interpretation of Findings

This unfortunately depends to a large extent on the experience of the individual operator, and involves the careful weighing up of the evidence from the examination of the semen together with the history of the bull.

Generally it is best to collect four samples of semen within half to one hour, but if this is not possible, a minimum of two samples should be taken. If the bull has been rested for a long period before testing, the first sample will be of poor quality. It, on the other hand the bull has been overworked, the volume and total number of sperm will be low. Generally the second and third ejaculates are most closely related to fertility, and during any examination, I would not allow a bull more than one poor sample, and the other samples must be of high class before I would pass the bull.

The main difficulty encountered is in the differentiation of bulls of high fertility, *i.e.*, conception rate of 1·0 to 2·0 from bulls of low fertility, *i.e.*, conception rate 2·0 to 3·5. On the tests described this is well nigh impossible. If the history of the bull is known, and his conception rate can be estimated, it is possible on one examination to classify bulls thus:—

1. *Fertile Bulls.*—Bulls producing semen reaching a high standard of quantity and quality of sperm are in this class. If the history of the herd indicates poor breeding efficiency, the cause should be sought for in the females.

2. *Sterile Bulls.*—Bulls in this class nearly always produce samples of very poor quality and quantity of sperm. These bulls when considered along with their history are easily recognised.

3. *Doubtful Bulls.*—Intermediate bulls present a difficulty and it is necessary to re-test at least once in seven to 14 days so that one may be able to incriminate the male or the females in the poor breeding efficiency.

The examination of a bull with no history is most difficult, and I would suggest two or preferably three examinations be made at weekly intervals before an opinion is given.

Quickness and vigour at service are not related to fertility and bulls with such characteristics may frequently produce very poor semen, and are often sterile, whereas slow working bulls are often highly fertile and good producers of semen.

Care should be exercised in assessing fertility of young bulls, *i.e.*, 12 to 18 months old, as I have found that these bulls often produce highly active semen of low volume and sperm concentration while proving highly fertile on mating. In such bulls the volume and sperm concentration increases with age.

As already stated, evaluation of semen in the field depends on personal factors and much experience is required in the handling and examination of semen before one can acquire confidence. Careful handling of the semen is essential on all occasions. The ultimate test of fertility is mating with normal cattle.

Behaviour of Bulls

This subject does not come under the scope of my remarks, but since Mr. Scorgie asked me to say a few words on the psychology of the bull, I will endeavour to make a few general observations. At an Artificial Insemination Centre, one is fortunate in having a considerable number of bulls under one's control, for example, at Reading we have eleven. The most striking feature is that each bull behaves as, and must be treated as, an individual. By careful observation, one quickly learns each bull's habits and preferences. This can be demonstrated by a few examples.

1. An old bull on a Centre will not work under any circumstances in the service crate in the yard. but will work regularly either with the cow loose in an adjoining field, or in a service crate in that field. It is believed that this bull at some time injured a leg on the service crate and therefore associates pain with service in the yard.

2. A conditioned reflex seems to have developed in one young bull. In this case, the bull will mount the cow immediately, but makes no attempt to serve until the artificial vagina is put into place.

3. Change of environment will often stimulate a bull to fresh activity, *e.g.*, changing the teaser cow, or changing the location of service.

4. Proper temperature and pressure in the artificial vagina is important. For instance, if a too hot artificial vagina is used, the bull may cease to serve, and change of environment is very often necessary to restart such a bull as he associates the service crate or the teaser cow with the pain. Similarly rough manipulation resulting in injury will cause refusal.

These few observations indicate that much experience has to be gained in the handling of bulls and carefully recorded observations would assist to this end.

Mr. E. Conn (A.I. Centre, Lyndhurst): The need for herd improvement is particularly manifest in the dairy herds of this country and it has been with this improvement in view that our War Agricultural Committees have been directing their efforts during the past two years, paying particular attention to the part played by the stud bull, a part fully appreciated by all. Examination for soundness from the veterinary aspect has been dealt with by the previous speakers, leaving me little need to amplify their remarks.

Many veterinary surgeons have found increasing requests from their clients for advice regarding the purchase of bulls which could reasonably be expected to effect herd improvement, and it would appear that the veterinary examination for soundness must include the responsibility of giving such advice if we, as a profession, are to play our part to the full. My experience lies with dairy stock, to which I intend to limit my remarks.

Examination of the bull can be divided into three parts:—

1. Examination of pedigree and records.
2. Inspection for conformation, stamina, type, etc.
3. Veterinary examination including diagnostic steps.

Examination of Pedigrees and Records

For this it is necessary to procure the extended pedigrees back to the fourth and fifth generation and to have records of daughters if any, and of sisters and half-sisters. From these records a great deal of useful knowledge can be acquired since they include records of milk yields and butterfat percentage. It is a great drawback to those seeking to buy bulls on these lines to find as they so often do inadequate records, and one lactation which one finds in pedigree records is of little use and too much importance must not be attached to it. Several lactations and butterfat yields are required to obtain a true picture.

From the figures shown in these pedigrees it is possible to see what the trend is; whether there has been a steady high milk yield with an adequate butterfat percentage through the preceding generations, whether there has been an increase or decrease through the generations, or if the records are erratic. From these facts it is possible to surmise whether the bull is a member of a line of heterozygous or homozygous animals for the genes associated with milk yields and butterfat. According to how the trend runs so a bull not only yields the genes passed on by his parents but adds or detracts from them. Facts such as these are of importance in grading up herds, in Artificial Insemination Centres and in the premium bull scheme.

Further examination of the pedigree will give evidence of in-breeding or line breeding and from these facts a greater insight into the bull's genotype can be established, especially if he is a proven sire. It must be remembered that in-breeding not only accentuates the good points but also accentuates the bad points and yet the only remedy to purify a strain is by more in-breeding.

The records of daughters, sisters and of half-sisters should be examined. It is important to have records of at least one complete lactation of these animals.

Inspection

This necessitates a careful examination of the bull, his dam and daughters, or again his sisters and half-sisters. The bull should conform to type, have width, depth, shortness of leg, and width between hind legs for udder development of his progeny. In the dam, daughters, sisters, and half-sisters, look for uniformity. In a grading-up herd, for example, one would expect daughters to be an improvement on the dam.

One should look out for weaknesses, particularly if in-breeding has been noticed in the examination of the pedigree. Look for well developed udders, placed well forward, teats well spaced. Examine teats to make sure bottle teats, fleshy teats, teat rings and hard milkers are absent; the sinus should be fairly wide to ensure an easy flow of milk. From my experience I have found that mastitis is more frequent in udders with teats that are abnormal, there being ample evidence also that bulls can pass on this tendency to produce coarse, poorly shaped udders and teats to their progeny. One has only to think of the Le Pouquelala strain of Guernsey—famous for udders and teats.

Veterinary Examination

This necessitates a careful check-up of impressions gained by inspection, giving a detailed examination to any weakness apparent or deficiencies of conformation noticed. Breeding history of the herd should be gone into and if necessary a pregnancy diagnosis should be made of animals reputed to be in calf to the bull in question. Testicles should be examined for evidence of induration,

uniformity of consistence (erectile), size, length of cord, and outline of epipidymis should be noted. The type of prepuce should be noted; a short tight prepuce is difficult to handle, especially in Artificial Insemination Centres, and as old age comes on, and abdominal muscles sag, the bull may show difficulty in effecting service.

When taking a sample of semen, note the bull's attitude to the cow and the artificial vagina; a slow bull, particularly if young, is likely to get worse and is never a good purchase, and from my experience he is very seldom of the highest scale of fertility.

On protrusion of the penis, note the presence of discharge, vesicles, nodules, growths, or scar tissue, evidence of repeated pyogenic infection. Occasionally a membranous attachment from the penis to the prepuce may be present causing the penis to turn downwards, thus preventing service. This is not an uncommon occurrence. Having taken the semen, examine for amount of motility and density. Dilute at least 1 in 4, re-examine for motility, and store at 5° C. Any good sample of semen should be active after four days, and if this sample is not active after this time, it is not up to standard.

During the cold spell experienced in January I found that semen obtained in collecting tubes at freezing point and below, diluted immediately and put into a refrigerator at 5° C., stored better than that obtained in collecting tubes, where precautions had been taken to insulate from the freezing air by a cotton-wool cover. Semen collected by the former method was quite active after eight days. This is a point, of course, where more tests can be of value.

The agglutination and tuberculin tests I need not enlarge on but I would like to add something on the tests for trichomonads. In my opinion the American method of taking smears from the prepuce is to be preferred. Here a tube with a bevelled end is inserted into the prepuce, the prepuce, of course, having been previously cleaned. A camel-hair brush is put up this tube into the prepuce, rotated there and withdrawn several times. A much better smear or smears is obtained using this method, simplifying the microscopical examination for the organism. When in practice in Northern Ireland I worked with Kerr on several outbreaks of trichomoniasis, and we made much use of the skin test as an adjunct to diagnosis; it was used as a herd test, and an infected bull seldom failed to show a reaction; 0·1 c.c. of tricin is inserted intradermally and a positive reaction can be expected to appear as a plaque-like swelling in ten to 30 minutes.

As a matter of interest, I would like to report my findings on several bulls which I was called to examine at various times when in practice. These animals were unable to protrude the penis further than eight inches. Nothing could be found amiss with them, until I had made a rectal examination. Here I found the prostate gland to be enlarged, being two to four inches in size, and in some cases pain was evident on pressure. This appears to be significant, as according to medical authorities, one of the theories put forward as an explanation of an enlarged prostate in man is sexual excess. And in going into the history of these bulls I found that they had been used extensively from an early age.

Careful handling when making rectal examination in the bull cannot be too strongly advocated, the rectum of the bull being much tighter than in the cow.

(To be continued)

Weekly Wisdom

". . . If members of the veterinary profession combined to express themselves coherently and act forcefully—instead of disputing among themselves the work already entrusted to them privately and vying with each other for the few salaried posts already created—so large is the field opening before their very eyes consequent on the present rapid and steady increase in knowledge and so fertile is that field in rare opportunities, that the work in which they could be employed and the posts that call for creation, not only could be increased, but multiplied tenfold, with immense and lasting advantage, both to themselves and to the public at large."—Anon.

* * * * *

In a lecture given by Dr. C. R. Harington, F.R.S., on "The Biochemistry of Iodine" (summarised in *The Journal of the Royal Institute of Chemistry*, p. 146) there is an historical note on the discovery of iodine and its uses by the Geneva physician, Coindet, in the treatment of simple goitre. During the later stages of the Napoleonic wars the French experienced difficulty in obtaining tution of saltpetre for the manufacture of gunpowder, and substitution of seaweed ash for wood ash as a source of potash led to corrosion of the vats. A search for this noxious agent revealed, in 1813, the presence of a new substance which formed violet-coloured vapour when heated.

THE VETERINARY RECORD
October 13th, 1945

EXAMINATION FOR BREEDING PROFICIENCY

THE value of a competent examination of animals prior to sale has long been recognised by both vendors and purchasers of high-class stock, and the veterinary certificate of soundness accepted as the best security and protection for all parties concerned, especially in relation to the sale of horses. Indeed, the sound judgment, skill, experience and integrity of the veterinary surgeon in this respect probably had a greater influence than any other single factor in raising the status of the British veterinary profession during the first three-quarters of a century of its history.

The examination of the horse for soundness is largely dependent upon anatomical factors and pathological changes in structure; this critical examination is undoubtedly a fine art, developed to a high degree by many of the earlier veterinary surgeons. Whilst the value of a veterinary certificate for soundness of horses still remains to a great extent, the importance of the horse as a factor in both civil and military transport and in farm work has decreased to such a degree during the last 30 years that the average veterinary practitioner and his clientele have become much less horse-minded than formerly and the bovine has become by far the most important animal in the national economy. That veterinary surgeons have not been slow to adapt themselves to altered circumstances is clearly exemplified in the discussion by the Central Veterinary Society, reproduced in this issue, on the examination of the stud bull for soundness.

The quality and suitability of the herd sire is obviously of first importance to the livestock industry, and the measures recently introduced as part of national policy provide for alternate standards of licensing of bulls which constitute the first essential step towards herd improvement.

It is abundantly clear that the examination of the stud bull is a far wider and more complex problem than that of the horse. Whilst it is true that purely physical factors, such as conformation and the condition of the genital organs, the heart, feet, etc., are of great importance, the examination to be complete and of the greatest value to the client does not end there. Of equal or even greater importance are the study of the pedigree; of the production records of the bull's female ancestors through a period of two generations as a minimum; if available, details of its breeding and health records; the examination of ejaculates; the biologic tests for freedom from disease, and the study of the psychology of the individual animal, including his ability or willingness to perform the act of copulation. The examination of bulls which are to be purchased for artificial insemination centres requires that particular emphasis be laid on willingness to serve, reaction to the artificial vagina, the quantitative and qualitative character of ejaculates and the type of conformation and psychology best suited to that particular work.

All these and many other points were amply developed during the discussion, which indicates the urgent need which exists for further research in the fields of genetics, animal husbandry (particularly that related to herd improvement and disease control), reproduction and infertility, upon which the determination of soundness or otherwise depends.

CLINICAL COMMUNICATION

Sudden Death of a Mare From Rupture of the Heart

JALAL-UD-DIN SHUJA, B.SC.
Final Year Student, Royal Veterinary College

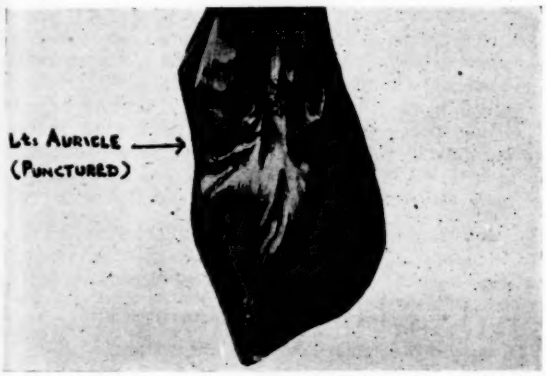
The following case seen in London is reported, as it may be of interest to the profession.

Subject.—Eight-year-old mare (vanner type).

History.—The mare was in apparent good health and condition. She was at work on the morning of August 22nd in pair with another horse drawing a load of approximately 2¼ tons. At midday the carter noticed her to be unwell and she was taken to a nearby stable for attention, where she collapsed and died within a few minutes of arrival.

The writer has no knowledge of the mare's past history except that she had previously lost condition over an unstated period and was given a period of rest. Having improved in condition she returned to work a fortnight before the incident.

Post-mortem Examination.—The carcase was removed to a knacker's yard for *post-mortem* examination two hours after death. The carcase was in fair condition. The contents of the abdomen were normal, there being no congestion of the viscera nor the presence of haemorrhage from the possible rupture of any parasitic aneurysm.



The chest cavity was then opened and examined and found to contain a fair amount of blood. The lungs and the heart were removed. The lungs were normal with only a slight congestion on the side upon which the mare had been lying.

The pericardium had ruptured, the heart was flabby and larger than normal. There was a rupture two inches long near the base of the left auricle just above the great coronary vein.

The pericardium, the endo- and myocardium were healthy. There were no signs of aneurysm macroscopically.

Diagnosis.—The cause of the rupture was obscure, and to quote:

(1) Runnell's "Animal Pathology": "Favourite places for spontaneous rupture of the heart are the right auricle and the ventricle. The aetiology is a combination of factors. A weakened area in the myocardium plus hindrance to the outflow of blood plus consequent increase in blood pressure. Primary weakening is due to various causes: heart aneurysm, myocardial degenerative changes in intoxication, infarction from coronary thrombosis and parasitic cysts."

(2) Dollar's "Veterinary Surgery": "Several cases have been recorded of rupture of the heart and of the lungs as a result of severe violence being inflicted on the chest wall without fracture of ribs. The author has seen rupture of the heart as a result of casting."

It is thought that rupture in this case was due to stress and probable myocardial degeneration, but the cause is the more obscure because, as the writer is informed, the load in question was very much smaller than that normally drawn by a pair of such horses.

One of the most noted stallions of the Suffolk breed, Monarch, owned by Sir Henry Bunbury, Naunton Hall, Rendlesham, has died, aged eight years, winner of first and champion at Ipswich in 1941 and of many other honours.

ABSTRACT

[Specific Diagnosis and Chemotherapy of Avian Coccidiosis. LEVINE, P. P. (1945.) *J. Amer. vet. med. Ass.* **106.** 88-90.]

Levine, writing from Ithaca, New York, states that in his area coccidiosis is the most important and devasting disease of chickens. Whilst eight species may singly or together be responsible, four of these species are the most frequently responsible and produce such typical gross lesions that a specific diagnosis may be made by a naked-eye examination of the intestine.

Eimeria acervulina—lesions usually in duodenum only, but sometimes extending well down beyond the middle of the small intestine. They are white streaks or patches of schizonts or oocysts all in the same stage of development. As a rule these lesions are only visible from the mucosal surface. The intestinal wall is thickened and there may be a catarrhal exudate but little or no haemorrhage.

Eimeria brunetti—mild cases show no lesions. Severe cases show a dry necrotic enteritis of usually the lower part of the small intestine, the rectum and also the narrow, tubular portion of the caecum. The lesions may be confluent or patchy and perforation may occur. The oocysts are large and often the disease is chronic when only a few oocysts may be found. The lesion in the caecum is a short caseous plug of the tubular portion. Birds of any age may be affected.

Eimeria necatrix—a common and pathogenic species effecting birds of all ages but most severely, as a rule, birds not less than two and a half months.

Severe cases show a marked dilation of the middle third of the small intestine. The intestinal wall is thickened, flaccid and often necrotic. From the serous surface numerous round white spots may be seen interspersed with pinhead-sized haemorrhagic spots. The intestine appears dark purplish red due to accumulation of clotted blood in its lumen. The mucosa is greatly thickened and necrotic, and smears show very large schizonts in grape-like clusters, but no oocysts. These colonies of schizonts are the white spots which can be seen through the serous surface but not the mucous as their situation is so deep in the intestinal wall.

Eimeria tenella—usually affects chickens up to three months old and causes the acute bloody caecal coccidiosis. The birds pass bright red bloody droppings and the caeca are distended with fluid blood. In older cases there may be a bloody caseous core in the caeca. The caecal wall is markedly thickened and may sometimes appear white due to masses of oocysts.

Eimeria maxima usually affects the lower half of the small intestine with a severe catarrhal enteritis. The exudate is sometimes somewhat blood tinged and the oocysts are large.

Eimeria praecox, mitis and *hagani* do not produce any pathogenic lesions.

Levine mentions two drugs as having definite coccidiostatic power, namely, sulphur and sulphaguanidine. Sulphur is stated to be effective against two species only, namely, *E. tenella* and *E. necatrix*. When fed at 5 per cent. of the ration these infections may be prevented but not cured. The other six species are not controlled by sulphur and continued feeding of sulphur in the absence of direct sunlight may produce rickets. It should not be used for more than two weeks during which time the source of infection should be cleaned up.

Sulphaguanidine will not cure birds already infected with the disease but will prevent infection with all of the species attacking chickens. When given in the diet a rate of 1·5 per cent. sulphaguanidine is needed to prevent *E. necatrix* infection, 1 per cent. *E. tenella* and ½ per cent. the other species. At the time of writing (August, 1944) sulphaguanidine was not readily available and was much too expensive for general use. Feeding of ½ per cent. sulphaguanidine in the ration gave no evidence of toxicity but with 1 per cent. or more the birds do not gain weight at the normal rate and after two weeks may lose weight, so it is recommended that a two-week period be not exceeded.

It is emphasised that chemotherapy should be used only as an adjunct to proper sanitary measures.

[The author mentions the removal of manure and cleaning of the houses but does not refer to the value of ammonia in disinfection of coccidia—see E. L. Taylor, C. Horton Smith (*Vet. Rec.*, 1940, 829). Furthermore, reference is not made to the English work showing the value of sulphamezathine and sulphadiazine in the treatment of caecal coccidiosis up to 72 to 96 hours after infection. (E. L. Taylor and C. Horton Smith, 1942, *Vet. Rec.*, **54**, 516.)]

J. S. S.

The Minister of Agriculture has decided that facilities may not be granted for holding the Royal and other shows of similar magnitude in 1946. The Royal Agricultural Society of England states that not until 1947 will their gatherings be resumed and the first assembly will take place at Lincoln.

REPORT

The Sterile Syringe

The syringe to-day is the hardest worked instrument of the veterinary surgeon; intradermal, hypodermic and intravenous injections are being carried out in their thousands every day. Fortunately for us the lower animals are somewhat resistant to pathogenic bacteria such as streptococci and staphylococci. In Great Britain we have not the danger of virus contamination; on the other hand, where extensive treatments are given to sheep the risk of syringe contamination with the *Cl. welchii* group of organisms, *Cl. chauvoei*, *Cl. septique*, *Cl. oedematiens* and *Cl. tetani* must always be borne in mind as accidents not infrequently happen.

The Medical Research Council has recently issued the report of its committee of experts under the chairmanship of Professor G. S. Wilson, appointed to consider what recommendations could be made for the proper sterilisation of syringes.*

Complete bacteriological sterility can be achieved only by sterilisation in the autoclave or hot air oven. Boiling in water destroys all but the spore-producing pathogenic bacteria. Boiling in water to which a little sodium carbonate has been added will also kill spores but cannot be recommended because the residual alkalinity of the syringe may destroy certain of the drugs and biological products to be injected. Chemical disinfectants, including alcohol, if they kill spores at all do so very slowly and cannot always be relied upon to destroy even non-sporing bacteria in syringes.

The report discusses the sources of infection of syringes and how to avoid them; the choice of syringe, all glass being for a number of reasons preferable to glass-metal; cleansing and sterilisation; the disadvantages of chemical disinfection; procedure for mass inoculation; the care of needles; and the use of syringes for special purposes.

Vaccine bottles which have to be used repeatedly are a source of worry to the practitioner, owing to the accidents due to the contamination of an injection fluid. Probably the best and most often recurring example in veterinary practice is the contamination of swine erysipelas serum and swine fever serum with swine fever virus when the same needle is used for the injection and for refilling the syringe. A fresh sterile needle must be used every time a rubber cap is punctured. An improved vaccine bottle is one in which the rubber cap is surmounted by a "Bakelite" screw cap containing inside a pad soaked in antiseptic; alternatively the rubber cap should be wiped with iodine or 75 per cent. alcohol before being punctured.

The only permissible chemical disinfectant is 70 to 75 per cent. v/v alcohol. Even then, only all-glass syringes, dissembled and immersed in the spirit (freshly prepared from four parts industrial methylated spirit plus one part water) for five minutes can be guaranteed free from vegetative pathogens.

When syringes are used for blood culture or for aspirating injected material the syringe should be washed out with a *cold* solution of 2 per cent. lysol by sucking up and expelling the fluid several times with the needle still in position. Hot fluid will coagulate protein, and the syringe will then stick. Syringes should be thoroughly washed before they are boiled; boiling will coagulate and fix any protein left in them. In districts where the water is hard, a film of chalk will collect on the syringe if it is boiled in tap water. Syringes coated with chalk are difficult to assemble and soon become worn. Distilled rain or softened water should be used for boiling. Weak HCl will dissolve chalk deposits from all-glass syringes.

Needles which are blunt or dirty make injections more painful and by producing cellular trauma probably increase the risk of infection. (Incidentally one sometimes wonders whether some of the doubtful results encountered in tuberculin testing may be due to this cause.) A new needle is not necessarily sharp. Inspect all needles before sterilisation and sharpen those that require it. An Arkansas slip-stone with the edges slightly curved is useful for this purpose. Fairly long bevels are required for general use, but short straight bevels are better for intradermal injection.

For tuberculin testing special syringes should be kept for the different types of tuberculin, and these should never be interchanged, as traces of, say, avian tuberculin in a syringe used for a mammalian test might lead to faulty test results. It is advisable to keep syringes of different coloured glass for different tuberculins.

The object of the memorandum is to provide a small handbook for teachers and for all who use syringes for injection or aspiration. The recommendations made are based on the experience of many workers and on bacteriological tests; they have been proved to be safe and practicable.

In this era of hypodermic medication and testing it should be read and digested by every veterinary surgeon.

* M.R.C. Memo. No. 15. H.M.S.O., 4d. net.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Oct. 17th.—Meeting of the Scottish Metropolitan Division, N.V.M.A., at Edinburgh ("Dick" College), 2.30 p.m.

Oct. 19th.—Meeting of the Mid-West Division, N.V.M.A., at Bristol (Royal Hotel, College Green), 2.30 p.m.

Oct. 24th.—Annual General Meeting of the Scottish Branch, N.V.M.A., at Edinburgh ("Dick" College), 2.30 p.m.

* * * * *

Annual Conference, N.V.M.A.

Greetings from the American Veterinary Medical Association

As members of the Association present at the recent Annual General Meeting will be aware, early in the proceedings the President announced the receipt of a message of greeting from the President and Members of the American Veterinary Medical Association. The message, which was read from the chair, was as follows :—

The General Secretary,
National Veterinary Medical Association,
36, Gordon Square, London, W.C.1.

Heartiest Greetings to Officers and Members assembled your Annual Meeting and congratulations to all Veterinarians of Great Britain and Ireland for splendid war-time achievements. May victory and lasting peace bring our Associations ever more in harmony to achieve our common goal.

James Farquharson, President,
American Veterinary Medical Association.

Annual Meeting having acclaimed this fraternal expression of goodwill, it was heartily agreed that reciprocal greetings be sent, and the following cablegram accordingly has now been despatched in reply :—

The President,
American Veterinary Medical Association,
600 S. Michigan Avenue,
Chicago, Ill.

The National Veterinary Medical Association of Great Britain and Ireland at its first post-war Congress, greatly appreciates cordial sentiments expressed by the American Veterinary Medical Association.

British Veterinarians heartily reciprocate expressed hopes that Peace will cement friendship, collaboration and co-operation with U.S.A. confrères, already enhanced during stay of many American Veterinarians in Britain during recent war years.

W. C. Miller, President.

* * * * *

Scheme for the Control of Certain Diseases of Dairy Cattle in Scotland

The Executive of the National Veterinary Medical Association, after agreement with the National Farmers' Union and Chamber of Agriculture for Scotland and the Ministry of Agriculture and Fisheries, recommends that undertakings under the Scheme for the Control of Certain Diseases of Dairy Cattle in Scotland, which are due to lapse, and which both parties are willing to renew on the basis of existing agreements, should be extended for twelve months.

This would mean that in respect of two or three years' undertakings, the 10 per cent. and 20 per cent. rebates respectively will continue to operate.

PERSONAL

Presentation to Mr. Esmond Brown, M.R.C.V.S.

His colleagues in the Ministry of Agriculture and Fisheries, Area 11—embracing Wilts, Hants, Berks and Isle of Wight—gave a luncheon at the White Hart Hotel, Salisbury, on October 6th, to Mr. Esmond Brown, Superintending Inspector, on the occasion of his impending retirement. The company included some past members of the area as well as most of the present ones.

After luncheon the company adjourned to pay tribute to Mr. Brown. Mr. W. A. Miligan, in the chair, proposed the Royal Toast and after a brief introduction called on Captain McCutcheon to propose the toast of "Mr. Esmond Brown." This was supported by Mr. E. G. Lamb and followed by short speeches from everyone present. Mr. Brown's sterling qualities both as a man and an official were stressed; his refreshingly youthful outlook on life, his energy, resourcefulness and independence of thought were mentioned by many and his loyalty to his staff and his constant source of inspiration and help to them were referred to by all. All considered that the Ministry had suffered a great loss which would be felt outside his immediate area, but the hope was expressed that his freedom from routine work would enable him to devote more time and energy and to turn his undoubted talents to working for the good of the profession on the Council of the Royal College of Veterinary Surgeons, where men with his qualities would be invaluable in the near future. Many thanked Mr. Brown personally for the help he had been to them in the past.

Mr. Esmond Brown received a great ovation on rising to reply and very skilfully referred to each person present in turn, mentioning an incident by which he would always remember them.

Mr. E. G. Morris then presented Mr. Brown with a silver tankard, suitably inscribed, and with an illuminated address. He referred to Mr. Brown's long experience in the Ministry and to the progress made in the past 36 years. He wished Mr. Brown all health and happiness in his well earned retirement. Mr. Brown suitably acknowledged the gifts and the company then sang "For he's a jolly good fellow" and gave three rousing cheers for Mr. Brown.

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Award for Gallant Service in Italy.—The award has been announced of the O.B.E. to Lt.-Col. R. C. Crowhurst, of the R.A.V.C., for gallant and distinguished service in Italy.

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Major and Mrs. Hogg Safe and Well.—Our readers will be pleased to learn that Mr. and Mrs. Robert Turner, of Bury St. Edmunds, have received communications from Major and Mrs. F. Hogg saying that they have been freed from P.O.W. Stanley Camp, Hong-kong, that they are both as well as can be expected under the circumstances, and looking forward very much to an early return to this country.

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Will.—Mr. Edward Price Edwards, M.R.C.V.S., of Sandy Lane, Prestatyn, left gross £11,491, net £11,388. He left £50 equally between the National Veterinary Benevolent and Mutual Defence Society and the Victoria Veterinary Benevolent Fund.

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R.C.V.S. OBITUARY

Walpole, Henry, Capt. late R.A.V.C., Metheringham, Lincs. Graduated London, 1894. Died October 3rd, 1945.

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ADDRESSES OF DISEASE-INFECTED PREMISES

Foot-and-Mouth Disease:

Dorset.—Kiddles Farm, Piddletrenthidd, Dorchester (Oct. 10th).

Swine Fever:

Beds.—The Piggeries, Grove Road, Slip End, Luton (Oct. 3rd).

Berks.—Red Cow Allotments, Caversham, Reading (Oct. 4th).

Cumberland.—Wall Head, Crosby-upon-Eden, Carlisle (Oct. 3rd).

Glos.—Oldcroft, Lydney; Brierley, Drybrook (Oct. 4th); Upper Oldcroft, Lydney; Cherry Tree Farm, Elton, Newnham (Oct. 8th).

Hunts.—West End, Fenstanton, Huntingdon (Oct. 8th).

Kent.—Grigg Farm, Grigg Lane, Headcorn, Ashford (Oct. 8th).

Lancs.—Barton Cottage, Peel Green Road, Eccles (Oct. 5th).

Lincs.—Curlew Lodge, West Bank, Sutton Bridge, Holbeach (Oct. 5th).

Midlothian.—Duddingston Mains Farm, Duddingston Crescent, Portobello, Edinburgh (Oct. 2nd); Barnton Dairy, Quality Street Lane, Davidson Mains, Edinburgh (Oct. 8th).

Norfolk.—11, Council Houses, Church Drive, Outwell, Kings Lynn (Oct. 3rd).

Northants.—Malsters Arms, Bradby, Daventry (Oct. 3rd); Ramsey Road, Whittlesey, Peterborough (Oct. 5th).

Suffolk.—Church Farm, Rickinghall Superior, Diss (Oct. 2nd).

Worcs.—19, Enville Road, Kinver, Stourbridge (Oct. 5th).

Yorks.—Smawthorne Allotments, Castleford (Oct. 4th).

Sheep Scab:

Montgomery.—The Garn Farm, Llanrhaiadr, Y.M. Oswestry; Glanhafon Isa Farm, Penybontfawr, Oswestry (Sept. 29th).

REORGANISATION OF THE SCIENTIFIC CIVIL SERVICE

White Paper Proposals

Two White Papers, presented to Parliament by the Chancellor of the Exchequer recently, announce salary increases to heads of departments in the administrative class of the Civil Service and their deputies and a complete reorganisation of the Scientific Civil Service, with improvement of salaries and careers.

The White Paper on the Administrative Class of the Civil Service (Cmd. 6680, Stationery Office, 1d.) announces increases in the salaries of permanent secretaries and deputy secretaries from January 1st next.

The second White Paper (Cmd. 6679, Stationery Office, 3d.) announces a complete reorganisation of the Scientific Civil Service, with improvement of salaries and careers. The scheme includes the creation of a scientific officer class recruited from highly qualified scientific graduates on salaries aligned, at certain points, to those of the administrative class. At the highest levels there will be salaries of £2,250 and £2,500, with two or three posts, in the whole Civil Service, at £3,000. The salary of the Permanent Secretary to the Department of Scientific and Industrial Research becomes £3,500.

There will also be an experimental officer class, which is to replace the present scientific assistant class. This class is to be recruited partly from boys and girls aged 18 to 19 who have specialised in scientific subjects, and partly from university graduates and from persons with experience in industry and engineering.

Salaries will range from £150 on recruitment at age 18 (with arrangements for higher starting salaries for older recruits) to £800. All these figures are subject to bonus addition, at present £60 for men. Provision will be made for the promotion of experimental officers to be scientific officers.

An Inter-departmental Scientific Panel is to be set up, under the chairmanship of Sir Edward Appleton, to keep under review the well-being and efficiency of the Government Scientific Service, and in particular to stimulate contacts between science in the Civil Service and science outside. Recruitment to the Service is to be centralised in the Civil Service Commissioners, who have appointed Dr. C. P. Snow, Fellow of Christ's College, Cambridge, to assist them.

Improved Status and Conditions of Service

The White Paper states that the Government are resolved that the conditions of service for scientists working for the Government shall be such as to attract into the Civil Service scientifically qualified men and women of high calibre, and to enable them after entry to make the best use of their abilities, in order that scientists in the Government service may play their full part in the development of the nation's resources and the promotion of the nation's well-being.

The proposals are divided under three main heads. These are better conditions of service for scientists, and in particular conditions under which their own experimental research will be both facilitated and stimulated; improvement of their status and remuneration; and centralised recruitment.

Departments employing scientific staff are asked now to review their establishments on the basis of the proposals in the White Paper. In particular, they are asked to review the allocation of work between scientific officers and experimental officers with a view to devolving as much as possible on experimental officers. Proposals for revised complements should be discussed with officers of the Treasury before they are finally formulated.

Decisions will be required on the terms on which existing officers are to be assimilated to the new organisation, and these will be announced later when future complements are clearer and after opportunity for further discussion with the Institution of Professional Civil Servants.

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H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office.

	Price	Post
Command Papers (Session 1944-45):		
(6607) West India Royal Commission (Chairman: Lord Moyne). Report. Dec. 21st, 1939	7 6	8 0
(6608) West India Royal Commission (Chairman: Lord Moyne). Report on Agriculture, Fisheries, Forestry and Veterinary Matters. (By F. L. Engledow, C.M.G.) Dec. 21st, 1939 ...	3 6	3 10
(6656) West India Royal Commission (Chairman: Lord Moyne). Statement of Action taken on the Recommendations	2 0	2 2
Colonial Office:		
West Indies: Development and Welfare in the West Indies, 1943-44. Report by Sir Frank Stockdale, K.C.M.G., C.B.E. Dec. 14th, 1944. (Colonial No. 189) (58-189)	2 0	2 2

MINISTRY OF AGRICULTURE NEWS SERVICE

Housing the Bull.—The new bull licensing regulations that came into force on June 24th last will enable farmers to select their bulls with the aid of the information given by the type of licence the animal carried. It will, in future, be much easier for a dairy farmer or beef producer to make sure that the bull he buys is of a type suitable to his herd and farming system. Legislative changes for the improvement of livestock, however, must be accompanied by proper management. If a bull is to be maintained in fit and trained condition, in addition to being well fed (but not overfed) he must be afforded ample exercise and be well housed.

A loose box, of not less than 12 feet square, offers good accommodation if it is well lighted and ventilated, free from draughts, and has a floor preferably of roughened concrete or grouted brick or stone. A feeding trough and hay rack should be fitted, and if possible an automatic drinking bowl should be provided so that the bull may drink at will. A closed yard adjoining the loose box is an advantage.

The bull should always be comfortable, warm and clean. This means ample litter. If litter is in short supply it may be restricted to that part of the box where the animal lies. The treading of the bull on the hard unlittered portion of the floor will help to keep his feet in good condition. Bedding should be shaken up daily and all droppings and wet litter removed. Once a year, at least, the walls should be whitewashed and at regular intervals the box should be cleaned out and disinfected. Should the bull have to be kept in a stall, it should be of sufficient size to allow the animal to lie comfortably. A neck chain or halter should be used for securing and not the nose ring. Even if a bull has a large house it is still advisable for him to have some daily exercise, either by having a run in a field or paddock or by being walked a mile or two. For bulls kept in stalls this exercise is essential for promoting general health and fitness and maintaining sound feet and legs.

Improper and harsh treatment is not going to improve the temper of any bull, and it must be admitted that most bulls are of uncertain tempers. But a bull will be more docile if from the beginning he is well housed, well managed and treated firmly but kindly.

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"OUR COLONIAL EMPIRE: THE NEXT CHAPTER"

Addressing the Royal Empire Society on the above subject, Mr. Oliver Stanley, M.P., who was Secretary of State for the Colonies from 1942 to 1945, said that the mandatory system was rather an out-of-date conception: he did not regard it as the test of progressive thought, but attached far more importance to the question of regional commissions, and he would like to see this system extended immediately.

When it came to the relationship of the Colonies with each other, it should be realised that political federation was the coping stone and not the keystone of territorial unity. He suggested that the Governors' Conference in West Africa should be revived, with the Colonial Secretary as its chairman. East Africa he did not believe ripe for the complete political fusion demanded in some quarters.

Turning to the problems of individual colonies, he said that the worst thing that could be done would be to try to devise some broad formula of self-government to cover them all. There was the problem of tempo, and also that of the character of government. It was a mistake to think that democratic self-government everywhere must always develop on the exact model of our own British constitution. We in this country had never faced the problem of the bi-national State.

The idea should not get about that the Colonial Empire was some Golconda of fabulous wealth. Nor did he believe that economic development could be brought about by some sort of Tennessee Valley Authority in this country. The plan for economic and social development must be worked out not in London but in the colonies themselves.

He had been disturbed by allusions in the Press to the scaling down of sterling balances in the various colonial territories. If they were scaled down it would be a poor requital for the patience with which they had borne their war sacrifices, and would make nonsense of the whole of the Colonial Development and Welfare Act.

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"Farming To-day" Broadcasts.—In this series, on Thursday next (7 to 7.15 p.m.), listeners will hear Mr. H. E. Harbour, M.R.C.V.S., speak on "The Cowshed." Mr. Harbour is attached to the Edinburgh and East of Scotland College of Agriculture, where he is Advisory Officer on Veterinary Science. In this broadcast, he will deal principally with the control of disease on the farm, in which the condition and maintenance of the cowshed plays an important part.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

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VETERINARY EDUCATION

Sir,—I notice in to-day's *Times* an obviously inspired leading article which as a profession touches us nearly. Minatory in tone, like the reported speech of Lord De La Warr at the N.V.M.A. luncheon, it is perhaps more domestic in its outlook than many of the letters which have enlivened your correspondence columns for some time past.

The Royal College of Veterinary Surgeons was granted a Royal Charter, not only to prevent the exploitation of the public by enterprising charlatans, but to provide a means whereby the nation's need for adequately trained veterinary surgeons could be met. It is suggested that we, members of the R.C.V.S., thereby became trustees for the nation, bound to do our utmost to supply its needs, in so far as our professional services were concerned, not only then but in the future.

The future is now. The nation needs more of us, not only to counsel "the farmers, cowmen, shepherds and all who have charge of livestock" in this country, but to play a vital part in the development of vast satellite countries, unable as yet to provide their own systems of veterinary education. The nation needs urgently more trained veterinary surgeons. Can we under our Royal Charter meet the nation's present needs? This should be our objective, and while justly jealous of our prerogative, we cannot afford to be unmindful of our responsibilities.

If we do not bicker unduly over the means surely our end can be attained.

Yours faithfully,

C/o Glyn Mills & Co., J. J. M. Soutar.
Kirkland House, Whitehall, London, S.W.1.
October 1st, 1945.

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PET SHOP SALES

Sir,—I am glad to note the letter of Mr. von Lustig-Lendva in this week's *Record*.

In Liverpool, and doubtless in many other large centres of population, this crying evil has had thoughtful consideration both by veterinary surgeons and the Royal Society for the Prevention of Cruelty to Animals, but up to now no serious impression has been made on this undesirable trade.

Recently the R.S.P.C.A., in consultation with the veterinary surgeons, suggested to the dog dealers of the city that they give a warranty to purchasers and allow inspection of their premises by veterinary surgeons and/or inspectors of the R.S.P.C.A. The scheme was rejected by the dealers.

The subject needs thoroughly ventilating among all animal lovers in the hope of finding a solution.

Yours faithfully,

49, Arundel Avenue, Liverpool, 17. James H. White.
September 29th, 1945.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Parasitic Mange•	Sheep Scab	Swine Fever
Sept. 1st to 15th, 1945 ...	2	8	—	2	43
Corresponding period in—					
1944 ...	6	9	1	10	141
1943 ...	10	3	—	3	25
1942 ...	10	98	—	7	31
Total Jan. 1st to Sept. 15th, 1945	80	109	6	51	702
Corresponding period in—					
1944 ...	133	72	7	77	865
1943 ...	207	15	6	113	382
1942 ...	236	445	26	130	329

Note.—The figures for the current year are approximate only.
• Excluding outbreaks in Army Horses.